

Knowledge, Attitude and Practice (KAP) Pertaining to Millets Among Nutrition Practitioners in Kerala

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Abstract

Millets are underutilised nutrient-rich grains with the potential to combat malnutrition. A lack of awareness regarding millets has prompted the initiative to observe, 2023 as the International Year of Millets. Key influencers for enhancing awareness regarding millet and promoting consumption will include healthcare professionals, primarily Nutrition practitioners. A study on the Knowledge, Attitude, Practices (KAP) of nutrition practitioners will provide insights regarding perspectives, which can translate as a crucial factor for promoting millet consumption in society. The study adopted was a cross-sectional survey with a validated questionnaire distributed online to nutrition practitioners in Kerala. The questionnaire assessed socio-demographic details, knowledge of millets, attitudes towards usage, and practices related to millet consumption. The KAP among nutritional practitioners indicates a disparity between attitude and practice, possibly due to availability and affordability. The study highlights the need for targeted interventions and educational programs to be designed based on the identified gaps and barriers to enhance millet adoption among dietitians and the general public in Kerala.

Keywords: KAP, Kerala, Millets, Nutritional Practitioners

1. Introduction

A majority of millets, also known as coarse grains, are produced in India. The resilience in adverse environments and nutrient profile positions millets as an ideal crop to ensure food security¹. Millets possess good digestibility and are the

least allergenic. Millets release a lower percentage of glucose and do so over a longer period than paddy rice, particularly polished paddy rice². These grains are exceptional due to their high calcium, dietary fibre, polyphenol, and protein content. Millets are rich in antioxidants that have nutraceutical benefits for human health. Both soluble and insoluble-bound

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phenolic antioxidant compounds are present in millets³ that protect the body from oxidative stress. Fibre and non-starch polysaccharides, two types of digestible carbohydrates that support blood sugar regulation, are abundant in millet and offer a range of health benefits. These benefits include lowering blood pressure, reducing the risk of heart disease, and preventing cancer, cardiovascular diseases, diabetes, and tumour incidence⁴. It has been suggested by Issoufou Amado *et al.*⁵, that millets are potential prebiotics as they boost the viability of probiotics, which have significant health benefits.

Consumption of millets like proso millet and pearl millet facilitates the synthesis of adiponectin, a hormone with anti-inflammatory properties and insulin sensitising effect aiding the prevention and management of metabolic disorders. The gluten-free grain millet is an excellent choice for individuals adopting a gluten-free diet as may be in the case of celiac disease. The prevalence of cancer has been reported to be lower in communities which regularly consume finger millet⁶. Linoleic acid and tocopherols are abundant in millet oil. Millets are alkaline foods, to achieve optimum health, an alkaline-based diet is recommended⁷.

Millets represent the cultural symbolism and culinary diversity of the Indian sub-continent. Hence it has been proposed by the Indian Prime Minister to the United Nations to consider millet as a prime crop to battle against food, nutrition and economic security in the year 2017. Millets are considered a Kharif crop across the Indian subcontinent, Kerala is one of the rich contributors to the agricultural wealth and ranks 20th in millet production.

The Project "Millet Village" jointly implemented by the Department of Agriculture Development and Farmers Welfare and Scheduled Tribes Development Department of the Government of Kerala is to rejuvenate the traditionally practised tribal agriculture in the hamlets of Attappady, the millet capital of Kerala. It envisages enhancing procurement, processing, packing, labelling, and marketing of value-added products of millets in addition to the production of millets, pulses, oilseeds, vegetables, and apiculture. 'Millet Village' project also aims at popularizing the consumption of traditional millet-based foods in vulnerable groups to alleviate nutritional deficiencies.

Nutrition practitioners and other health professionals play a crucial role in advocating healthy diets to the public, and their KAP towards millets are crucial in the promotion and adoption of millets. Assessment of the KAP of dietitians towards millets can help identify gaps and barriers, design targeted interventions and educational programs, and

contribute to the overall promotion and adoption of millets in Kerala and other regions of India. This study envisaged assessing the KAP of dietitians regarding the nutritional properties and health benefits of millet.

Further, an attempt was made to identify the factors that inhibit and facilitate the promotion and adoption of millet among nutrition practitioners.

2. Materials and Methods

The study was conducted to evaluate the knowledge, attitude and practice of millet among nutrition practitioners in Kerala. A cross-sectional survey design with Snowball sampling and informed consent was adopted. The sample size comprised ten per cent of members of the Indian Dietetic Association (IDA), Kerala Chapter. The primary inclusion criteria are nutrition practitioners in Kerala (academicians, clinical practitioners, and research scholars) and willingness to participate. Non-Keralites were excluded from the study.

The study was conducted with the aid of a pre-tested structured questionnaire over three months from March to June 2023. The questionnaire comprised four sections; socio-demographic details using Kuppusamy socio-economic assessment scale 2022, evaluation of knowledge, attitude and practice of millet usage. A 5-point Likert scale from strongly disagree, disagree, neutral, agree and strongly agree was adopted to elicit data. The knowledge percentage was computed as a total of the correct answers divided by ten and multiplied by a hundred to arrive at the per cent value. For attitude scores, all positive sentences were scored from one to five in increasing order from one for strongly disagree to five for strongly agree. The negative sentences were coded inversely. The attitude percentage was further computed as the total attitude score divided by sixty multiplied by a hundred. In the case of the practice scores, eight questions were considered to compute the total practice score and the percentage value was the total practice score divided by forty multiplied by hundred. The KAP scores were further classified as poor ($\leq 25\%$ score), fair (26-50 % score), good (51-75 % score) and excellent ($\geq 76\%$ score) respectively. The differences in KAP score after classifying for region, religion, socio-economic strata and years of experience were assessed using One-way ANOVA whereas that for marital status and type of family were assessed using independent sample t-test. Scatter plots and Pearson's correlation were used to analyse the correlation between KAP. Data was analysed using SPSS version 25 for Windows.

3. Results and Discussion

The demographic profile of the study population is depicted in Table 1 and indicates that the majority (98.7%) of subjects were females. On studying the type of family seventy per cent were nuclear families and more than 60% belonged to the upper middle class or upper class as per Kuppusamy scale classification.

The knowledge about millets was assessed with ten questions as depicted in Table 2.

Table 1. Demographic profile of subjects

S.No	Variables	Frequency (n=300)	Percentage %
I	Gender		
1	Female	296	98.7
2	Male	4	1.3
II	Region		
1	North Kerela	54	18
2	Central Kerela	106	35.3
3	South Kerela	140	46.7
III	Religion		
1	Christian	94	31.3
2	Hindu	149	49.7
3	Muslim	57	19
IV	Marital status		
1	Married	181	60.3
2	Unmarried	119	39.7
V	Type of family		
1	Nuclear	216	72.6
2	Joint	76	24.8

A vast majority (89.7%) of subjects indicated a correct response that millets do not contain gluten thus making them ideal for celiac disease. The knowledge that finger millet is a good source of calcium and iron was observed in 86.7% of respondents. Two aspects, millets are rich in thiamine and millets grow in tropical and subtropical regions and are drought and pest-resistant had lower levels of knowledge at 36.3% and 38.3% respectively.

Table 3 depicts attitudes among study subjects using twelve statements.

Table 1. Continued...

3	Extended	8	2.6
V	Socio economic strata		
1	Upper lower	67	22.3
2	Lower middle	46	15.3
3	Upper middle	141	47
4	Upper	46	15.3
VI	Occupation		
1	Nutritionist	8	2.7
2	Home maker	13	4.3
3	Research Scholar	26	8.7
4	Academician	34	11.3
5	Clinical dietitian	219	73
VII	Years of experience		
1	Scholars	26	8.7
2	< 5 years	167	55.7
3	5 to 10 years	42	14
4	10 to 15 years	33	11
5	15 to 20 years	16	5.3
6	>20 years	16	5.3

Table 2. Knowledge pertaining to Millets among the participants

S.No	Knowledge criteria	Frequency (N=300)	Percentage %
1	Rajasthan has the largest region under millet cultivation	195	65
2	Millets grow in tropical & subtropical regions and are drought and pest resistant	115	38.3
3	Amaranth and buckwheat are considered pseudo millets	186	62
4	Absence of gluten makes millets ideal for celiac disease	269	89.7
5	Excess consumption of millets causes goitre	175	58.3
6	Germinating millets enhances nutrient bioavailability	240	80
7	Dietary fibre imparts prebiotic activity to millets	233	77.7
8	Finger millet is a good source of calcium and iron	260	86.7
9	Millets are rich in thiamine	109	36.3
10	Millets do not contribute to Omega-3 fatty acids in intake of diets	229	76.3

For most positive sentences, most respondents had a good attitude as most of the respondents reported agreeing to strongly agree for most sentences. Unlike popular belief, 41% of respondents reported disagreeing to strongly disagree with millets being difficult to digest.

The attitude was moderate for millet consumption, 42.7% disagreed that there is a risk of allergies

Table 4 depicts practices related to millet consumption. The most commonly consumed millet was finger millet (71.3%) followed by little millet (15.3%). The highest

Table 3. Attitude pertaining to millets among participants (n=300)

S. No	Attitude Criteria	Strongly disagree		Disagree		Neither		Agree		Strongly agree	
		n	%	n	%	n	%	n	%	n	%
I	Negative sentence										
1	Risk of food allergies	21	7	107	35.7	120	40	44	14.7	8	2.7
II	Positive sentence										
1	Offers multiple health benefits	9	3	0	0	4	1.3	129	43	158	52.7
2	Can reduce the risk of adverse health problems	7	2.3	3	1	15	5	194	64.7	81	27
3	Can assist weight management	1	0.3	8	2.7	0	0	174	58	117	39
4	Substitute to cereals in our daily diets	4	1.3	23	7.7	40	13.3	154	51.3	79	26.3
5	Palatability of millets is at par	2	0.7	27	9	82	27.3	173	57.7	16	5.3
6	Ideal for all age groups	15	5	0	0	19	6.3	190	63.3	76	25.3
7	Promotes maintenance of gut microbiome	0	0	6	2	23	7.7	202	67.3	69	23
8	Facilitates attainment of human Sustainable Development Goal (SDG7)	1	0.3	4	1.3	70	23.3	179	59.7	16	5.3
9	More difficult to digest	19	6.3	104	34.7	61	20.3	104	34.7	12	4
10	Ideal weaning foods	0	0	8	2.7	48	16	179	59.7	65	21.7

Table 4. Practices related to millet consumption

S. No	Practise Criteria	Frequency	Percentage
		n=300	%
I	Most Frequently Consumed Millet		
1	Finger millet	214	71.3
2	Proso millet	1	0.3
3	Foxtail millet	27	9
4	Little millet	46	15.3
5	Kodo millet	7	2.3
6	Barnyard millet	5	1.7
II	Frequency of Consumption		
1	Rarely	51	17
2	Monthly	182	60.7
3	Fortnight	41	13.7
4	Daily	26	8.7
III	Preferred Method of Cooking		
1	Boiling	165	55

Table 4. Continues...

2	Dry roasting	35	11.7
3	Steaming	60	20
4	Frying	5	1.7
5	Others	35	11.7
IV	Factors Detrimental to Millet Consumption		
1	Lack of proper millet-based recipes	64	21.3
2	Dislike the taste of millets	93	31
3	Poor availability of millets	81	27
4	Food allergies with millet consumption	17	5.7
5	Time consuming preparation	27	9
6	Others	18	6
V	Problems Encountered with Consumption of Millets		
1	Yes	27	9
2	No	273	91

frequency of consumption reported was monthly (60.7%) and a meagre 8.7% of subjects reported consuming millet daily. The most preferred method of cooking millets was boiling. The factors that were detrimental to millet consumption included dislike for taste (31%), poor availability (27%) and lack of adequate knowledge of millet-based recipes (21.3%) respectively.

A practice adopted by respondents with respect to preferred preparations and feasibility for incorporation of millets is depicted in Figure 1 and 2 respectively.

Respondents were asked to rate consumption of millets with respect to their use for different preparations and the data obtained is depicted in Figure 1. The highest rating concerning preference regarding consumption was porridge (38%). Other preferred methods include

Savoury preparations, desserts, dishes prepared for Kerala breakfast, and boiled dishes.

Almost 67% of respondents reported agreeing to strongly agree for commonly using millets for desserts and porridges. About 90% reported that it is convenient to incorporate millets in traditional Kerala cuisine preparations like puttu, appam, noolputtu etc. This suggests that there is a positive approach among respondents concerning practices related to millet.

On studying level of knowledge, attitude and practices, among the respondents, 78.3% had good to excellent knowledge regarding millets, all respondents had good to excellent attitude towards millets and 71.4% had good to excellent practices towards millets depicted in Figure 3.

Figure 1: Preference of consuming millet preparations

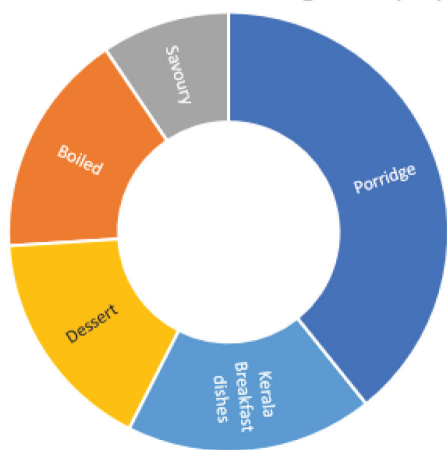


Figure 1. Preference of consuming millet preparations.

Incorporating in traditional dishes

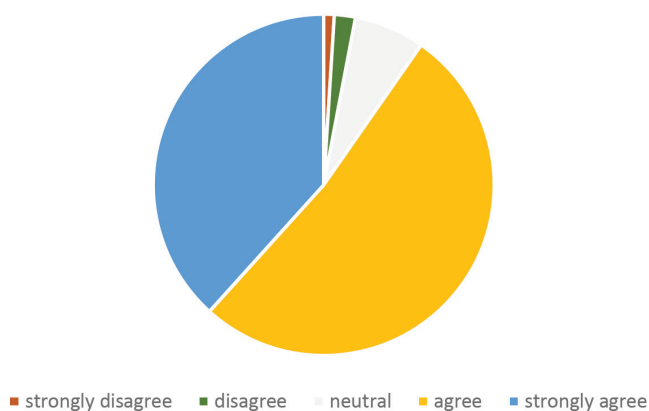


Figure 2. Feasibility for incorporation of millets in traditional Kerala preparations.

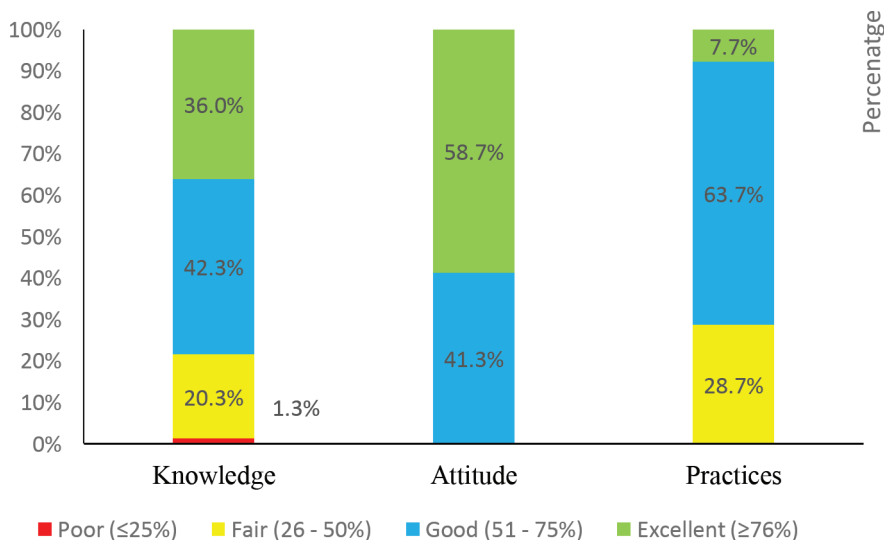


Figure 3. KAP level of millets.

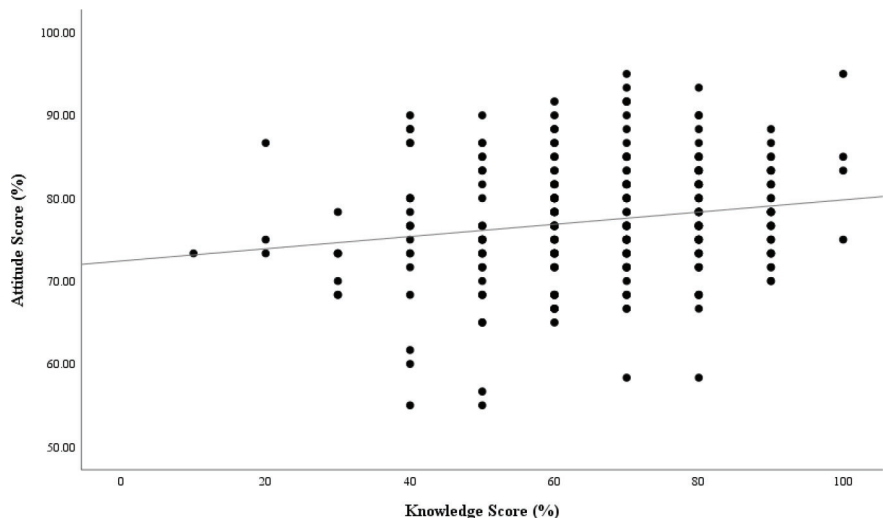


Figure 4(a). Correlation of knowledge and attitude scores pertaining to millets.

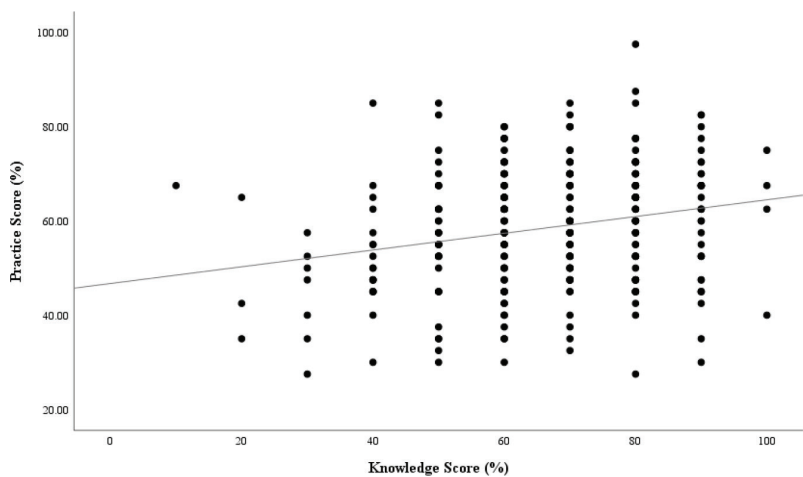


Figure 4(b). Correlation of knowledge and practice scores pertaining to millets.

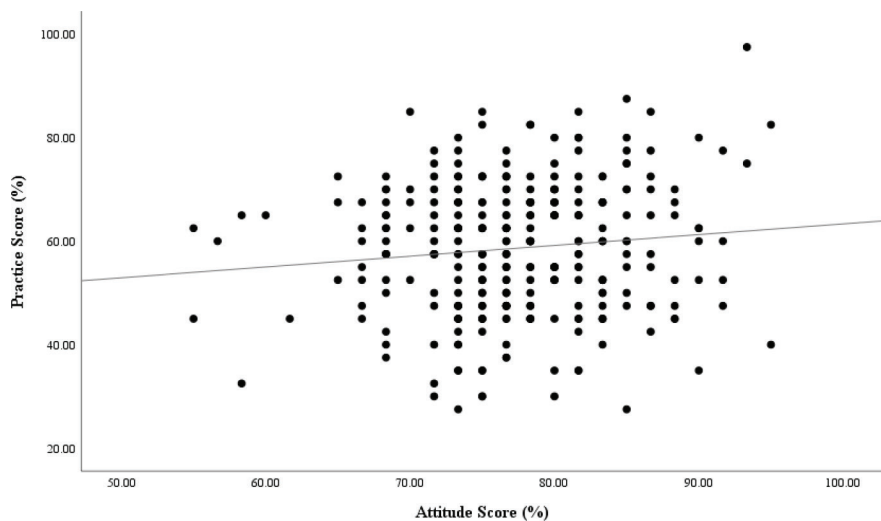


Figure 4(c). Correlation of attitude and practice scores pertaining to millets.

Figure 4(a)-4(c) gives a correlation of knowledge, attitude, and practices. There existed a significant positive correlation between knowledge and attitude ($r=0.171$, $p=0.003$). There also existed a significant positive correlation between knowledge and practice ($r=0.219$, $p=0.001$). There existed no significant correlation between attitude and practice ($r=0.087$, $p=0.113$).

4. Conclusion

Dietitians and nutritionists are the professionals who are instrumental in influencing food consumption patterns in the general population through mass media and diet clinics. Their KAP is a critical factor for information dissemination and promotion of millets by the general public. There is limited published literature in this area, therefore, the KAP among Dieticians is a novel study, and there are no comparable references on the topic. Awareness regarding the potential health benefits of millet consumption did not translate into regular inclusions in the diet, indicating an evident knowledge-practice gap that needs to be bridged. Attributing factors for this gap can be the accessibility, affordability and availability respectively.

Awareness of nutritional benefits and varieties of millets was evident but substitution as a staple grain was missing among respondents. Millets should be made more readily available to kids and teens through programmes like the School Noon Meal Program and the Integrated Child Development Services (ICDS), as well as the Public Distribution System (PDS).

The observation of 2023 as the International Year of Millets emphasises the need for the enhancement of awareness and a strong emphasis on the critical

components of the value of nutrients found in millets, improving their bioavailability, and highlighting their advantages in resolving current health problems. This also paved the way to investigate traditional food recipes and implement efficient strategies for utilising them. It requires the real-world application of theoretical knowledge in practice.

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